

ABSTRACT OF THE DISCLOSURE

A replaceable, electronically-isolated, MCP-based spectrometer detector cartridge with enhanced sensitivity is disclosed. A coating on the MCP that enhances the secondary electron emissivity characteristics of the MCP is selected from aluminum oxide (Al_2O_3), magnesium oxide (MgO), tin oxide (SnO_2), quartz (SiO_2), barium fluoride (BaF_2), rubidium tin (Rb_3Sn), beryllium oxide (BeO), diamond and combinations thereof. A mass detector is electro-optically isolated from a charge collector with a method of detecting a particle including accelerating the particle with a voltage, converting the particle into a multiplicity of electrons and converting the multiplicity of electrons into a multiplicity of photons. The photons then are converted back into electrons which are summed into a charge pulse. A detector also is provided.